Tipularia

A BOTANICAL MAGAZINE

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IN THIS ISSUE

Summer Lace

By Mary R. Sanders

Wild Carrot, Angelica, Queen Anne's Lace, and Bird's Nest (*Daucus carota*) are names given to my favorite summer wildflower. From May through August in the southeastern states you will see it standing a little taller than most of its neighbors in our open fields and roadsides.

It's sometimes difficult to pick one's very favorite wildflower when each season of the year presents many candidates. However, since it is mid-summer as I write, I readily affirm that Queen Anne's Lace is without a doubt my favorite. Perhaps it will be yours also.

The untrained eye sees Queen Anne's Lace as a snow-white flower composed of many (sometimes 18 to 25) small clusters on a tall stem, with only a few thin leaves that resemble the tops of carrots. (Do you suppose my fondness for raw carrot salad is a coincidence?) Upon looking more closely at the flower, you are aware of the beautiful circular arrangement of the whole cluster and you are surprised to see a single purplish flower in the center of the cluster. I've been told that this purplish flower represents a time when Queen Anne's finger was pricked by a needle as she was making lace. Who knows?

This exquisite flower is actually very hardy and patiently accepts its harsh environment, which often consists of poor soil mixed with loose gravel. It admirably tolerates the scorching sunshine even in periods of drought. Throughout its lifetime it competes for space with equally hardy weeds.

Another surprising characteristic of Queen Anne's Lace is its form after the flowers have faded, become dried, and been replaced by fruits for next year. The flower clusters curl to the center and become a "bird's nest," which holds the seeds until time for them to be released by the wind and rain. It's quite acceptable for you to harvest one of these "nests," take it home to sow your own seeds, and anticipate having Queen Anne's Lace nod to you summer after next!

If there are sermons in stones, as I'm sure there are, there are sermons also in wildflowers that endure their "stress" situations successfully with tolerance, determination, and dramatic beauty.

When the Going Gets Tough, the Tough Take Root

By John Gorecki

A source of continual fascination for me as an amateur urban botanist is the power of plants to survive and even thrive — in largely unregarded splendor — in the midst of man's constructions and devastations. These are the common wildflowers that share man's urban sprawl yet go almost unnoticed.

Moss verbena (*Verbena tenuisecta*) holds on to the margins of levelled lots and cascades over curbs into busy streets. The tough stems of *Sida rhombifolia* hold aloft their whorled corollas down dry, dusty alleys behind almost every residence. A single stalk of wild lettuce (*Lactuca canadensis*) thrusts up through a crack in a parking lot and grows up to cast its shadow high on the wall of an adjacent building. The primrose willow (*Ludwigia decurrens*) waves its flowers from a ditch beside a car lot. The yellow stars of camphorweed (*Heterotheca subaxillaris*) and the tiny heads of blue curls (*Trichostema dichotomum*) float over old trash piles and abandoned gravel mounds, while tall spikes of rattlebox (*Crotalaria spectabilis*) unfurl their bright yellow blossoms around a fire hydrant stuck out in the upturned clay and sand of a new "development." It amazes and vexes me that until recently I never paid attention to these riches. Now my awareness of them makes me a part of their world of splendor, a world intersected but seemingly unnoticed by the world of busy human affairs.

One bright November day I climbed the great sand dunes in east Albany. At the top, on a little island of matted grass and roots and human debris, surrounded by the tracks of roaring ATV's, grew a tiny colony of tread-softly (*Cnidoscolus stimulosus*), its white flowers shining out against the dark green leaves—a triumph of survival and beauty.

Front Cover *Cladastris lutea* (Francois Michaux) Karl Koch. and *C. sinensis* Hemsley (the latter redrawn by Jean Farr Pittillo and based on p. 209 H. Johnson, 1973, *The International Book of Trees,* New York, Simon and Schuster).

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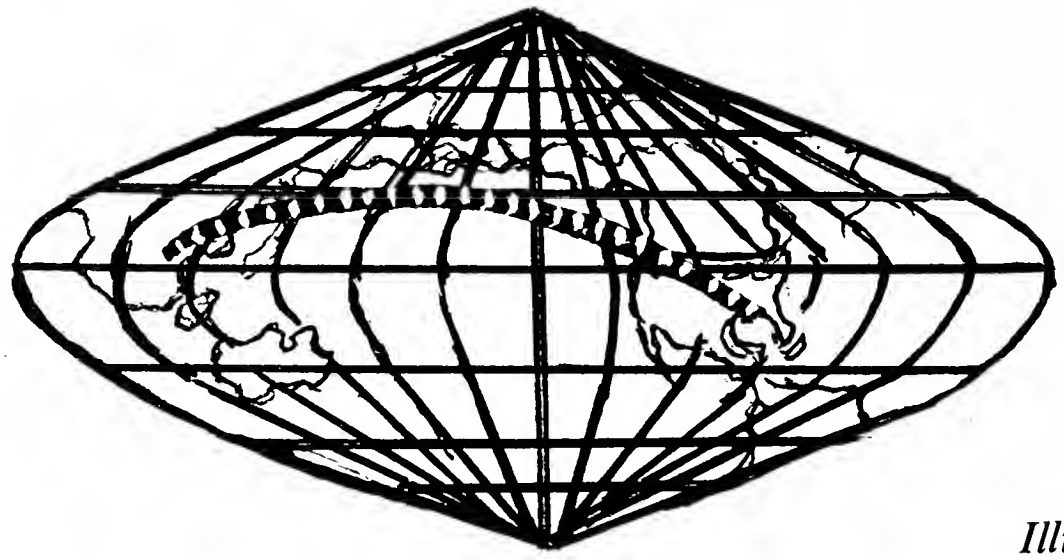
The legend of plants common to Southeastern Asia and Southeastern North America



It All Fits Together

By J. Dan Pittillo

Illustrated by Jean Farr Pittillo

John Muir noted that whenever he tried to pick something out of the universe, he found it tied to everything else. I have been reminded of this wholistic idea time and again.

In the early 1960s I was a graduate student at the University of Kentucky, and as I began to study yellowwood (*Cladrastis lutea*), my advisor John Warden suggested that I read some of the classical papers in the "Journal of the American Philosophical Society." I had already become quite intrigued with some theories put forth by Stanley A. Cain, a graduate student at the University of Tennessee, relating to the refugial nature of the Great Smoky Mountains' vegetation. Cain, Emma Lucy Braun, and many other ecologists of that period considered yellowwood a relict of the Tertiary Period. Not only did I learn that this yellowwood might be related to the fossils found in western Tennessee (which were classified as *Cladrastis eocena* Berry), but also might have counterparts in southeast Asia. Thus my interest was whetted about the nature of *Cladrastis* in those far-away lands of the Orient.

The opportunity to pursue my quest came unexpectedly. Western Carolina University's chancellor, Harold F. Robinson, met Mr. Zhao Ji, president of Yunnan University, at a national meeting of college and university presidents in 1981. An agreement between them led to initial visits of our administrators, followed by botanists. This was appropriate, since botanical exploration had been traditional for both regions. James W. Wallace, our plant physiologist specializing in flavenoid chemistry, and I readily accepted this adventure.

There were hundreds of questions in our minds. Could we visit this Communist country, shrouded behind the mysterious bamboo curtain, in safety? Was the country so thickly populated that one could not easily walk the streets without being crushed? Had all the natural vegetation been obliterated except for those species used for food or fiber? Were the mountains all barren red and yellow clay soils and the valleys full of mud and flooding rivers during the rainy season? Would I have the chance to see *Cladrastis?*

Yunnan Province occupies the southwestern corner of the Peoples Republic of China. Along the west it is bound by Burma; to the southeast by Laos and Viet Nam; to the northwest it abuts Tibet. It has 168,417 square miles, nearly three times the size of the state of Georgia (58,876 sq. mi.). Its average elevation is 6,000 feet, but it is situated farther south than Georgia, with Kunming, the centrally located capital city, at the same latitude of Miami, Florida. Its annual rainfall averages 50 to 60 inches, but most of it comes in the monsoon season during summer. Except for the higher elevations to the west near Tibet

and the lower elevations near Viet Nam (Xishuangbanna), the weather is nearly springlike all year, hence Kunming's motto, "City of Eternal Spring."

We flew into Kunming in early April. As the clouds of Hong Kong dissipated behind us, the red hills appeared below. But no, there were trees on top of many of the hills. The Yunnan Plateau loomed below, and it was brown with some green scattered about. The brown turned out to be mostly winter wheat being harvested. Green was from pine trees on the hillsides with a little grass between, and horsebeans (apparently a variety of fava or broad bean, *Vicia faba* Linnaeus) in the fields. When we arrived at Kunming, the cultivated irises were blooming as were the cultivated herbaceous peonies (of Europe and Asia Minor), but ironically, not the native Chinese tree peonies. It was yet another month until some of the spring plants, as I knew them, would be blooming.

We were scheduled to give several seminars at Yunnan University. We tested the proverbial Chinese patience when we asked to go on an unscheduled trip to Dali with the teacher group. We were advised we could go; then our consciences began to take hold; they insisted we should go, however, and within a few days we boarded a bus and were off. The distance was not very far, perhaps some 250 miles, but the trip required two days.

We had just left the headwater valleys of the Yangtze River west of Kunming and were climbing one of the narrow gorges west of Chusuing, I wondered, "Could that have been *Cladrastis*?" But the road was very narrow, and how could I ask the Chinese to let me get a better look? I talked with my English friends and asked if they would inquire of the Chinese officials if I could stop to see the trees? No, we were too far behind on our schedule.

Beyond the beautiful mountain town of Dali on the head-waters of the Mekong River, we journeyed on to the town of Lijiang. Here we experienced being among the first botanists to visit since Joseph Rock's early botanical exploration before the revolution in the late 1940s. This area has a grandeur much as Denver, Colorado, appears to an easterner upon the first visit. The Jade Dragon Mountains were snow capped, and the vegetation was a delight to the eye. The spring flora was just breaking with larches, spruces, azaleas, rhododendrons, willows, birches, strawberries, wild irises, and more in bloom.

On the way back, I continued to ask if we could stop for a few moments. Finally the Chinese leader agreed, only to deflate my enthusiasm with, "Oh, that's just a locust!" It certainly reminded me of *Cladrastis*. I later reviewed my information, checked with manuals, herbaria specimens, trees at the National Arboretum, and discussed the question with colleagues, and came to the conclusion that the early spring plants were probably a closely allied genus, *Maackia*. *Maackia* differs from *Cladrastis* in having buds not covered by the petiole base and apparently more leaflets (the plant in question had 15-18 leaflets covered with a silky yellow-brown pubescence). The closely allied *C. sinensis* occurs elsewhere in Yunnan, so someday I must go back to see this other relict of the Tertiary Period.

Back in Kunming, I began to explore the local hills. Here I found more familiar species that might be expected in our Southeast. My research involved the comparison of the local vegetation with the "pollen rain" that collects in moss polsters beneath the forest canopy. This would serve to establish the base-line data to help support our interpretations of the paleopollen in the area lakes for future studies.

One of the first forest trees I noted was *Pinus armandi,* which would be taken by many casual observers for the white pine (*P. strobus*) of north Georgia. They appeared to have been planted, which I eventually found to be the case. Also in my field plots was what

Vicariads — *The separate occurrence of corresponding species*

Common name	Scientific name	Chinese vicariad
Trees		
Winterberry	*Ilex ambigua* var. *montana* (Torrey and Gleason) Ahles	*I. macrocarpa* Oliv.
White pine	*Pinus strobus* Linnaeus	*P. armandii* Franchet
Loblolly pine	*Pinus taeda* Linnaeus	*P. yunnanensis* Franchet
Chestnut oak	*Quercus prinus* Linnaeus	*Q. aliana* Bl.
Sweet birch	*Betula lenta* Linnaeus	*B. aloides* Ham.
Sweet gum	*Liquidambar styraciflua* Linnaeus	*L. formosana* Hance
Red mulberry	*Morus rubra* Linnaeus	*M. laevitata* Wall.
Yellowwood	*Cladrastis lutea* (Francois Michaux) Karl Koch	*C. sinense* Hemsley
Storax	*Styrax grandifolia* Alton	*S. grandiflorus* Griffith
Ironwood	*Carpinus caroliniana* Walter	*C. loudoniana* H. Winkl.
Hackberry	*Celtis occidentalis* Linnaeus	*C. yunnanensis* Schneider
Southern magnolia	*Magnolia grandiflora* Linnaeus	*M. delavayi* Franch.
Shrubs		
Viburnum	*Viburnum obovatum* Walter	*V. foetidum* Wall.
Bayberry	*Myrica pensylvanica* Loisel.	*M. nana* Cheval.
Litsea	*Litsea aestivalis* (Linnaeus) Fernald	*L. cubeba* (Lour.) Pers.
Spicebush	*Lindera benzoin* (Linnaeus) Blume	*L. communis* Hemsley
Prickly ash	*Zanthoxylum clava-herculis* Linnaeus	*Z. bungeanum* Makim.
Mountain rosebay	*Rhododendron catawbiense* Michaux	*R. decorum* French.
St. Johns-wort	*Hypericum prolificum* Linnaeus	*H. patulum* Thunberg & Murray
Fetterbush	*Pieris floribunda* (Pursh) Bentham & Hooker	*P. formosa* D. Don
Carolina rhododendron	*Rhododendron minus* Michaux	*R. siderophyllum* Franchet
River cane	*Arundinaria gigantea* (Walter) Muhlenberg	*Sinarundinaria nitida* (Mitf). Nakai
Old-man's beard	*Chionanthus virginicus* Linnaeus	*C. retusa* Lindley & Paxt.
Horsesugar	*Symplocos tinctoria* (Linnaeus) L'Her.	*S. chinensis* (Lour.) Druce
Blueberry	*Vaccinium myrsinites* Lamarck	*V. fragile* Franchet
Dwarf gray willow	*Salix humilis* Marshall	*S. inamoena* Handel-Mazzette
Vines		
Bamboo	*Smilax laurifolia* Linnaeus	*S. marei* L'evi
Wisteria	*Wisteria frutescens* (Linnaeus) Poiret	*W. brevidentata* L.
Peppervine	*Ampelopsis arborea* (Linnaeus) Koehne	*A. delavayana* Planchet
Virgin's bower	*Clematis virginiana* Linnaeus	*C. fasciculiflora* Franchet
Wild yam	*Dioscorea villosa* Linnaeus	*D. panthaica* Prain et Berkill
Climbing magnolia	*Schisandra glabra* (Brickell) Rehder	*S. sphenanthera* Rehder et Will.
Greenbrier	*Smilax auriculata* Walter	*S. lunginesis* Wang et Tang.
Berchemia	*Berchemia scandens* (Hill) Karl Koch	*B. yunnanensis* Franchet

)rresponding or separate environments

Common name	Scientific name	Chinese vicariad
Herbs		蒸草
Indian turnip	*Arisaema triphyllum* (Linnaeus) Schott	*A. erubescens* (Wall.) Schott
Dayflower	*Commelina communis* Linnaeus	*C. communis* Linnaeus
Monkshood	*Aconitum uncinatum* Linnaeus	*A. vilmorianum* Kam.
Ditch stonecrop	*Penthorum sedoides* Linnaeus	*P. chinense* Pursh
Corydalis	*Corydalis sempervirens* (Linnaeus) Persoon	*C. taliensis* Franchet
Wild strawberry	*Fragaria virginiana* Duchesne	*F. nilgersensis* Schlecht ex Gay
Bedstraw	*Galium aparine* Linnaeus	*G. aparine* Linnaeus
Cranesbill	*Geranium carolinianum* Linnaeus	*G. nepalensis* Sweet
Least rattlesnake plantain	*Goodyera repens* (Linnaeus) R. Brown var. *ophioides* Fernald	*G. repens* (Linnaeus) R. Brown
Yellow star-grass	*Hypoxis hirsuta* (Linnaeus) Coville	*H. aurea* Lour.
Wood sorrel	*Oxalis corniculata* Linnaeus	*O. corniculata* Linnaeus
Cinquefoil	*Potentilla canadensis* Linnaeus	P. griffithii Hooker f.
Solomon's seal	*Polygonatum biflorum* (Walter) Elliott	*P. kingianum* Coll. et Hemsley
Primrose-leaved violet	*Viola primulifolia* Linnaeus	*V. phillipica* Cavanilles
Blue violet	*Viola papilionacea* Pursh	*V. delavayi* Franchet
Grasses		青草
Grasses		
Bentgrass	*Agrostis tenuis* Sibthorp	*A. mirantha* Hook. f.
Sweet vernal grass	*Anthoxanthum odoratum* Linnaeus	*A. hookeri* (Greesbach) Rendl.
Wood reedgrass	*Calamagrostis cinnoides* (Muhlenberg) Barton	*C. arundinacea* (Linnaeus) Roth
Beard grass	*Erianthus contortus* Baldwin ex Ell.	*E. rickii* Keng
Millet	*Paspalum distichum* Linnaeus	*P. distichum* Linnaeus
Annual bluegrass	*Poa annua* Linnaeus	*P. annua* Linnaeus
Foxtail	*Setaria glauca* (Linnaeus) Beauvois	*S. plicata* (Lam.) T. Cooke
Ferns and Fern Allies		羊齿植物
Ferns and Fern Allies		
Scouring rush	*Equisetum hyemale* Linnaeus	*Hippochaete* (=Equisetum) *debile* (Rox b.) Milde
Mountain spleenwort	*Asplenium montanum* Wildenow	*A. pekinense* Hance
Silvery spleenwort	*Athyrium thelypterioides* (Michaux) Desvaux	*A. dissitifolium* (Bak.) C. Christ
Marginal shield fern	*Dryopteris marginalis* (Linnaeus) Gray	*D. basisora* Christ

Chinese characters by Cam Vuong

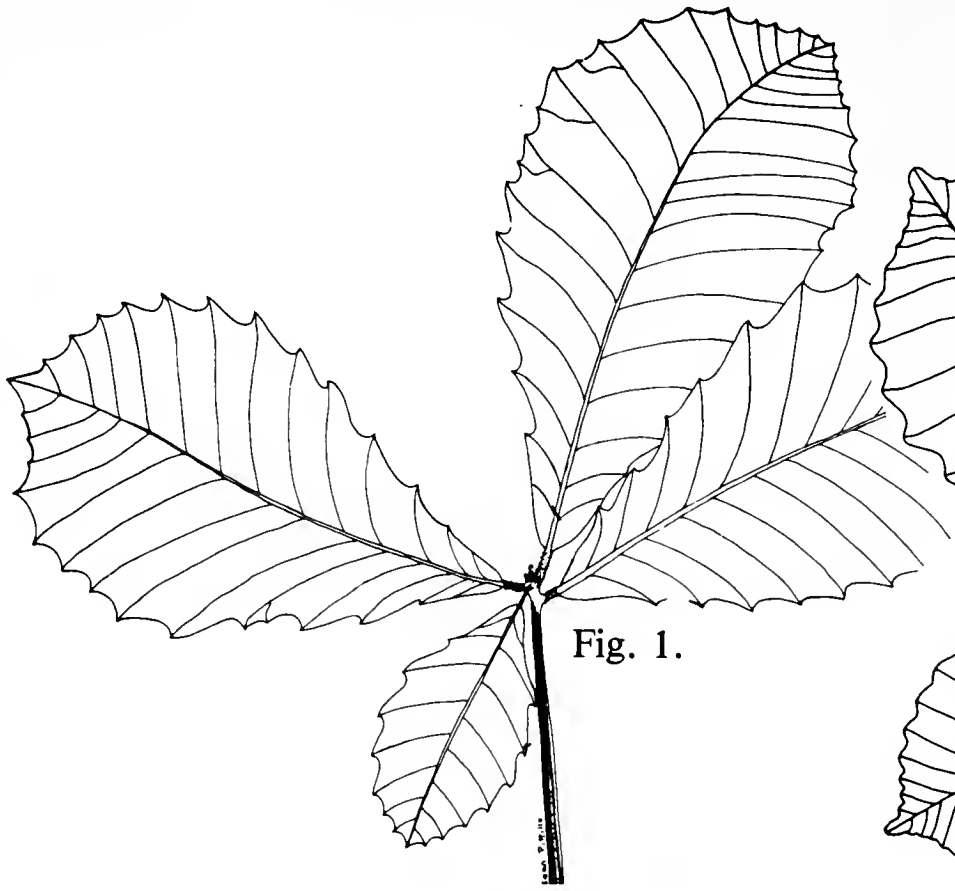


Fig. 1.

Fig. 1. *Quercus aliena* Hemsley. Note more pointed teeth and pubescent petiole bases compared to *Q. prinus*.

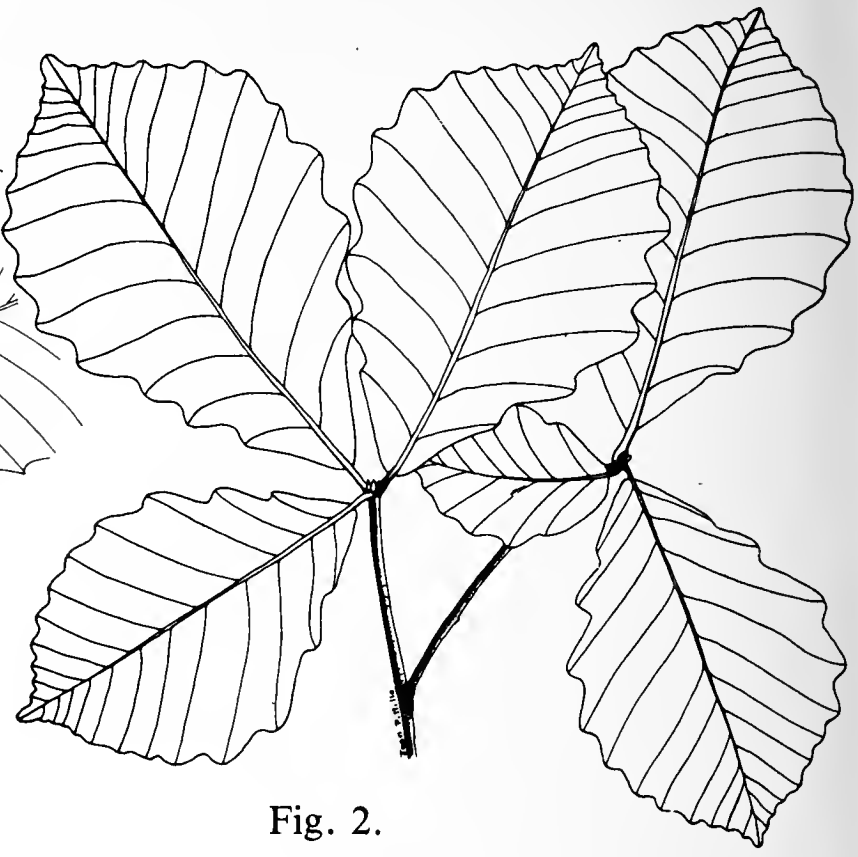


Fig. 2.

Fig. 2. *Quercus prinus* Linnaeus. Note more rounded teeth and glabrous petioles compared to *Q. aliena*.

appeared to be chestnut oak (*Quercus prinus*), but was actually the closely allied *Q. aliena*. There was storax (*Styrax grandifolius*), a tree-sized alder (*Alnus nepalensis*), a deciduous holly with larger berries than I had seen before (*Ilex macrocarpa*), greenbrier (*Smilax lunginesis*), elderberry (*Sambucus adnata*) that is almost a twin for our species, and woodferns (*Dryopteris basisora* and *D. juxtaposita*). Except for the tree-sized blueberry (*Vaccinium bracteatum*), *Keteleeria, Castanopsis,* and *Lithocarpus,* I felt quite at home in the forest.

The open areas of the mountains also had many familiar-looking species. In the limestone scrub pastureland, I noted yellow star-grass (*Hypoxis aurea*), a blue violet (*Viola phillipica*) mimicking our primrose-leaved violet, cinquefoil (*Potentilla griffithii*), blueberry (*Vaccinium fragile*), maleberry (*Lyonia ovalifolia*), evergreen rhododendron (*Rhododendron siederiphyllum*), willow (*Salix inamoena*), strawberry (*Fragaria nilgerrensis*), otherwise similar to ours but with white fruit, bay star vine (*Schisandra sphenanthera*), berchemia (*Berchemia yunnanensis* and *B. floribunda*), and wild yam (*Dioscorea panthaica*). Even in the limestone crevices where what appeared to be mountain spleenwort (*Asplenium montana*), *A. pekinense,* and in shaded cliffs, a filmy fern (*Mecodium [=Hymenium] exertum)*, which looked very much like our Pickens County, S.C. plant, Tunbridge fern (*Hymenophyllum tunbridgense*).

As if all this was not convincing enough, there were blue azures, grey hairstreaks, sulphurs and several other butterflies familiar to the Southeast that were flitting about pollinating the plants. Can you believe that I began to feel at home half-way around the world?

After our gruelling two-day trip back from Lijiang to Kunming, the stomach virus caught up with me. I feared that I would not be recovered in three days to go to the tropical paradise of Yunnan, Xishuangbanna. But with the help of Chinese traditional medicine (derived from natural materials), I was in the airport awaiting flight to Simao by Thursday. We flew the entire distance in a little

over one hour that had taken two day's hard driving in the jeep for our interpreter and botanist friend, Professor Hu Zhihao.

We all continued by jeep down to the Tropical Botanical Institute and the Crops Plant Institute in Jinghong. Xishuangbanna is at a much lower elevation than previous stops (perhaps 2,000 feet) on the Mekong River just above Laos and Viet Nam. The temperature matched the location, being about 104 degrees the day we arrived.

We found virgin forests there—mostly tropical evergreen seasonal rainforests. Huge trees topped the shorter ones with understory jungles, including the ever present bamboos. We were told wild elephants and occasionally tigers were reported in the jungles. While I saw no elephants or tigers, I did see wild fowl which reminded me of game chickens, except that the roosters had very long tail feathers.

On one day the forest protector, a lady, accompanied us into the jungle across the Laso River, a tributary river of the Mekong. Here were wild bananas, many ferns, a blue-leaved *Selaginella* growing up to knee height, and on some cliffs beside the waterfalls was a most curious plant. I was told it had just recently been described in the literature as one of the *Pilea* species, though it certainly did not remind me of ours. It had succulent leaves about 1 cm long and 0.5 cm wide, and a white line along the midrib of the dark green leaf; the leaves hung in a row on each side of the brown and scaly stem. The plant, up to 15 cm long, hung from the rocky crevices limply and draped over one's hand when lifted.

I felt like I was in an entirely different country in this tropical lushness, no farther south of Kunming than we had been west the week before, and were still in Yunnan Province.

The similarities between the vegetation of southern China and the southeastern United States have long impressed botanists. We can theorize that the two areas represent relict floras from the common, more widely distributed floras of the Tertiary Period. But it would appear that, unless our connections were more recent than the time when the supercontinent, Gondwanna, was joined, many of our common floral elements predate the Tertiary. Certainly some groups must date back nearly to the Carboniferous, or when the angiosperms arose in parts of these ancient land masses. The question of whether or not our common genera, often so close in specific characteristics, could have similarly survived several million years is one that still intrigues many of us, including the Chinese.

Professor Sun, who lives at Yunnan University, believes that China has the older species from which ours derive. It makes sense that some species might have come across the Bering Land Bridge during the glacial periods, but there must have been considerable climate modification or polar shift to account for the many cold weather intolerant species to have come by that route.

So the legend of the shared plants continues to create intrigue. The impact of seeing the vicariads is an enriching experience. By all means, if you have the opportunity to travel to China, do so. Arrangements can often be made with professional botanists, especially if reciprocal arrangements are possible. You should make plans about a year in advance; the time will be well spent.

Acknowledgements—The Western Carolina University International Programs in agreement with Yunnan University provided travel funds to assist in this work. Yunnan University provided field transportation, subsistence, and field assistance of several graduate students with Professor Hu Zhihao the primary coordinator and interpreter. Dr. Anthony E. Brown kindly reviewed the manuscript. To all these the author is very grateful.

You too can locate natural environments of botanical significance

Ecoteering

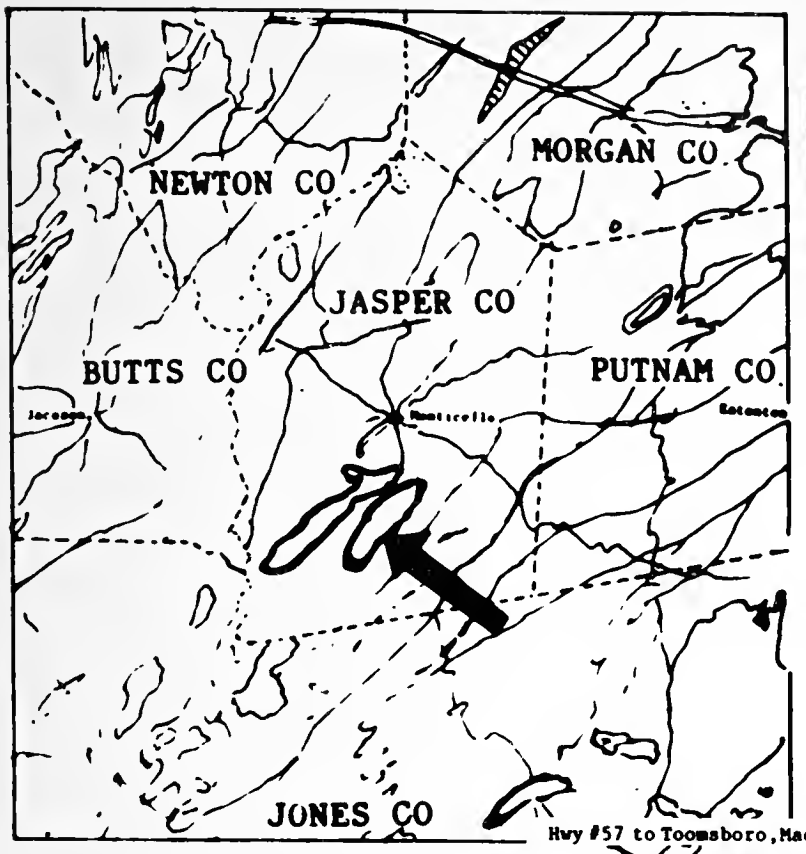
By Charles H. Wharton

As various conservation agencies search the Georgia landscape for significant natural areas, their small field staff will need all the help they can get. What techniques can we use in finding intact natural areas? While Roland Harper often located interesting botanical sites from train windows, most of us have problems with 55 m.p.h. highway botany. Natural environments such as cypress ponds are readily identifiable at highway speeds but others are not, such as the subtle change from slash pine (*Pinus elliottii*) to pond pine (*Pinus serotina*) that might indicate a depression bog on the Coastal Plain. Unusual areas such as the oak woodland-savannah over the peculiar, magnesium-rich bedrock of Burk's Mountain (Columbia Co.) can rarely be spotted from a car. They require either hard-to-get publications or the guidance of a botanist who has somehow found them. There is, however, a do-it-yourself method that can make *you* a local authority, as well as assist you in locating valuable natural areas for preservation.

During the course of field work, Steve Bowling and I developed a systematic approach to finding exciting natural environments which might have quasi-original vegetation or unusual plants. Since it involves using topography, geology, soils and vegetation, we call it "ecoteering," an ecologically oriented form of orienteering. Simply stated, it is the simultaneous use of the state geologic map, topographic maps, county soil surveys, and county road maps, assisted by magnifying glass and compass. An altimeter is useful in the mountains. The objective is to pinpoint a destination from published information, locate the closest road and then use compass and topographic map for the terminal hike. The following discussion of some environments to which you can "ecoteer" will clarify the technique.

At home, one can start with the multi-colored state geologic map. Unusual or "rare" map colors may indicate interesting botanical environments. As a strange geologic feature, look at the green ultramafic (um) blob named Soapstone Ridge south of Atlanta or locate the two green mafic (basic) areas (mp2) south of Monticello (Jasper Co.) (Fig. 1). The geologic map indicates the rock as a gabbro, a basic rock yielding iron, magnesium and calcium. The county soil survey indicates the soil as Iredell, with a plastic, olive clay subsoil serving as a "waterproof" hardpan (or aquiclude) that evidently ponds or "perch-

(continued on page 12)



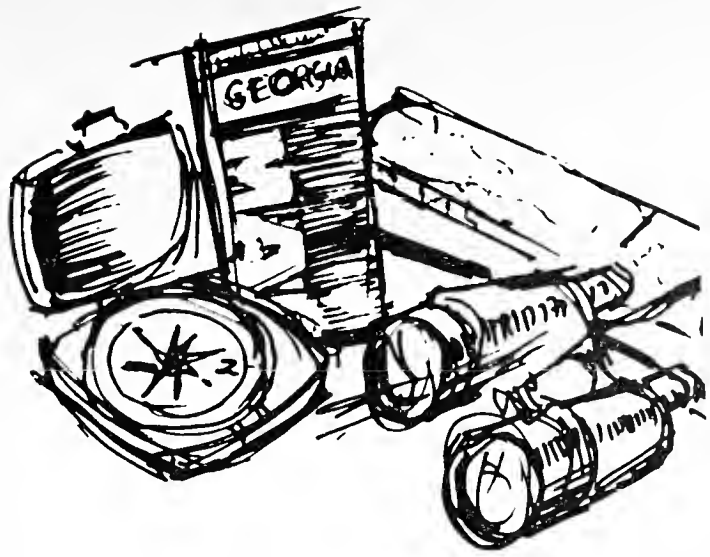


Fig. 1. Mafic areas of norite gabbro on the Georgia Geologic map south of Monticello (Jasper Co.) bearing the curious "upland wetlands" (Monticello Glades) with species, such as swamp palm *Sabal minor,* characteristic of river floodplains.

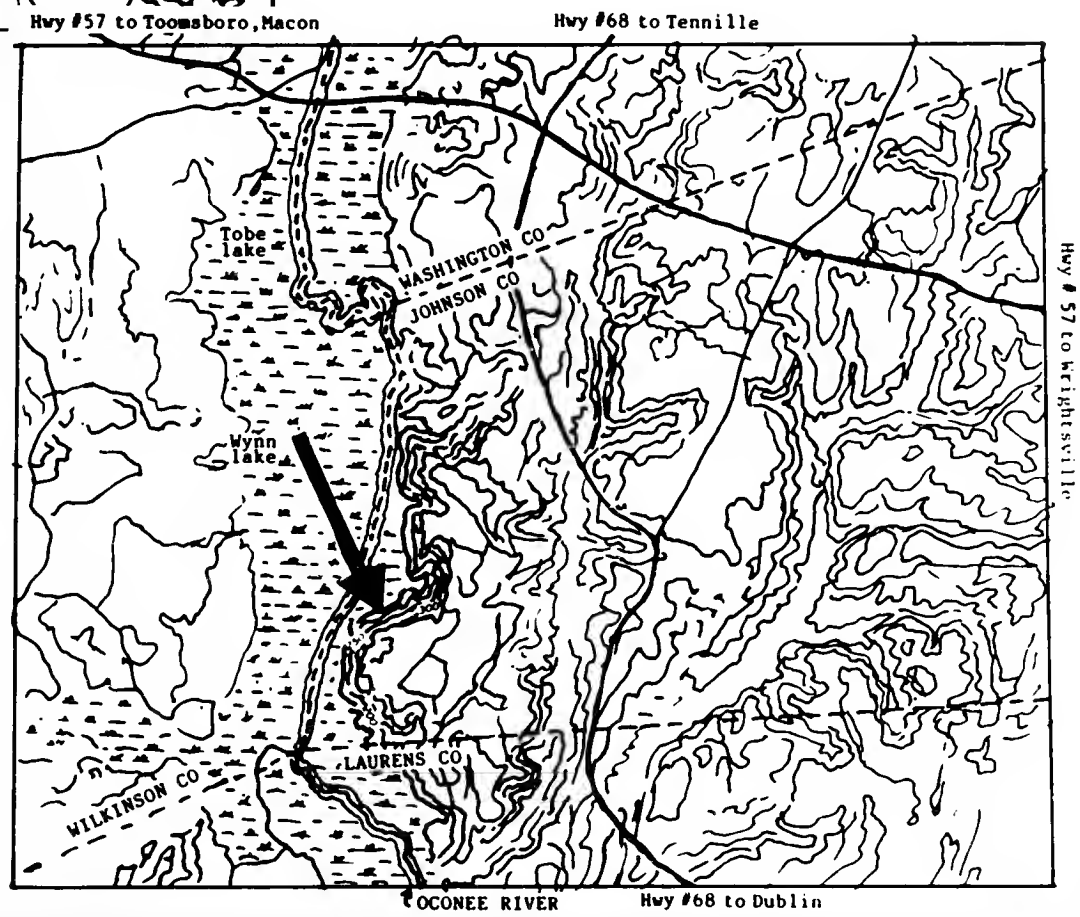


Fig. 2. A northward facing bluff (forested) over 120 feet in elevation along the Oconee River on the Dublin, Georgia 1:100,000 quadrangle. The arrow also overlies two presumably forested "lakes" in the floodplain and, just north, an open, marshy lake (beaverpond?) (lake details not visible in this figure).

HOW TO OBTAIN MAPS AND SURVEYS

Geologic map, topographic maps, special area studies: Contact map clerk, Georgia Geologic Survey, 19 Martin L. King, Jr., Drive S.W., Atlanta, Georgia 30334; (404) 656-3214. Geologic map is $3.00; postage $1.50 folded, $2.50 rolled. Topographic maps (ask for *guide sheets* for both scales, also ask for *map symbol sheet*): 1:100,000 scale, $4.00 each; postage for each sheet same as geologic map, 1:24,000 scale, $2.50 each, postage: one map $1.00 folded, $2.00 rolled; 2-4 maps, $1.50 folded, $2.50 rolled; 10-20 maps $2.00 folded, $3.00 rolled. For special area studies, ask for Circular No. 1 listing all publications of Georgia Geologic Survey.

County road maps: Contact Georgia Department of Transportation, Attention: Map Sales Office, #2 Capitol Square, Atlanta, Georgia 30334; (404) 656-5336. $1.50 each, no postage.

County Soil Surveys: Contact Soil Conservation Service Office of each county individually. Some counties do not have soil surveys completed yet; others do, but cannot supply copies. Most can send you (free) soil maps, legend and index, which is probably adequate. There is a Georgia directory of all Soil Conservation Service offices; contact any county office of the Cooperative Extension Service, U.S. Dept. of Agriculture.

es" water and explains the curious upland swamp associations called the "Monticello Glades." These wetlands contain vegetation normally found on river floodplains such as the dwarf palmetto or swamp palm (*Sabal minor*), as well as carpets of atamasco lilies (*Zephyranthes atamasco*). You can readily locate the extent of the glades by flat areas on the 1:100,000 Milledgeville Quadrangle, as well as by a community and creek, both called Gladesville. These place names alone should pique your curiosity. The more detailed, 7.5 -minute, 1:24,000 quadrangles (Monticello, Hillsborough and Berner) cover the glades. Be sure to ask for an index guide sheet to *both* sets of quadrangles so that you can find which maps you need in advance of your trip. Your suspicion should also be aroused to note that these flat areas are colored green on the topo sheets, meaning they are forested. With the exception of floodplains, agriculture cleared all Piedmont flatland long ago, even ridge tops. Iredell soil conditions evidently made agriculture impractical (unfortunately these areas are now being logged).

North-facing bluffs, especially along rivers (Fig. 2), make good ecoteering "targets." Many support species with northern affinities. Begin your adventure with the 1:100,000 quadrangle, then acquire the appropriate 1:24,000 topo sheet and the soil survey, if available. After you have found a bluff on the maps, consult the geologic map. The ideal bluff (bearing interesting plants) would be over a calcareous, or basic, substrate. In the Piedmont and Blue Ridge, limestones (or their metamorphosed equivalent, marble) are rare. Here one must rely on the presence of amphibolites and hornblende — heavy, dark basic rocks that release (on weathering) varying amounts of calcium and magnesium. In the geologic map key these are listed as mafic, ultramafic and metamorphosed mafic rocks, mafic schists and metavolcanics. The fabulously rich Pumpkinvine Creek bluff (Bartow Co.), with plants such as Alleghany spurge (*Pachysandra procumbens*), is over gneissic rock containing base-yielding plagioclase feldspar and hornblende. On bluffs with amphibolite schists along the Yellow and Alcovy Rivers (see p. 148 in Wharton, *The Natural Environments of Georgia*), one finds fragrant sumac (*Rhus aromatica*), shooting star (*Dodecatheon meadia*), upland swamp privet (*Forestiera ligustrina*) and coral-berry (*Symphoricarpos orbiculatus*). Look for red cedars to indicate such bluffs. Other trees, redbud (*Cercis canadensis*), chalk maple (*Acer leucoderme*), chinquapin oak (*Quercus muehlenbergii*), bluff oak (*Quercus austrina*), shagbark hickory (*Carya ovata*) and American smoketree (*Cotinus obovatus*) may also indicate basic or circumneutral soils (even the acid granites can yield sufficient calcium if the plant is close to the rock itself). Some herbs, sharp-lobed hepatica (*Hepatica acutiloba*), wild ginger (*Asarum canadense*), decumbent trillium (*Trillium decumbens*), some false garlic (*Nothoscordum bivalve*), blue phacelia (*Phacelia bipinnatifida*), and monkshood (*Aconitum uncinatum*) may also be indicators of plant preference, although not necessarily obligate calciphiles. Eastern red cedar (*Juniperus virginiana*) is also the dominant tree of cedar glades found on some stratigraphic flats on limestone in northwest Georgia.

While the 1:100,000 topographic series is excellent to scan for bluffs, it will not show detailed surface relief, such as limesinks, which may be shallower than the 10-meter contour. To locate sinks such as near Tennile (Washington Co.) you will need the 1:24,000 Sandersville Quadrangle. On this map, Steve and I were struck by a pair of sink-like depressions at the head of Dyer's Creek (Fig. 3). Striking a compass course across fields we were able to verify that one indeed was a rare "natural" marsh (white), the other had a marsh (white) surrounded by trees

(green). This quadrangle was photo-revised in 1985 and is apparently quite accurate, although it does not record the streams which emerge from caves, complete with shark's teeth. The geologic map indicated that such areas were probably in Irwinton Sand (Ei) where limestone is close to the surface. A nearby outcrop (Es) has been quarried.

As with the shortcomings of the topographic maps, some rock outcrops are not marked on the geologic map. Not shown on the 1976 map is a commercially-mined marble outcrop near Gainesville. Its northeastward extension into Stephens County explains the incredible richness of the Panther Creek bluffs. For more precision than the state geologic map affords, one goes to local or regional studies (such as Pruitt's, who completed an M.S. thesis at Emory University entitled, "The Brevard Zone of Northeasternmost Georgia," or McConnell and Abrams' Geology of the Greater Atlanta Region). The Georgia Geologic Survey (Consult Circular No. 1) can suggest studies that detail your area, and the Soil Conservation Service can supply information on soils, such as the Iredell, thus allowing you to maximize your field trip efforts.

There is always the chance that these techniques can be used by unscrupulous collectors. Hopefully, this will be more than offset by the discovery of new areas which can be preserved before they are lost by lack of recognition.

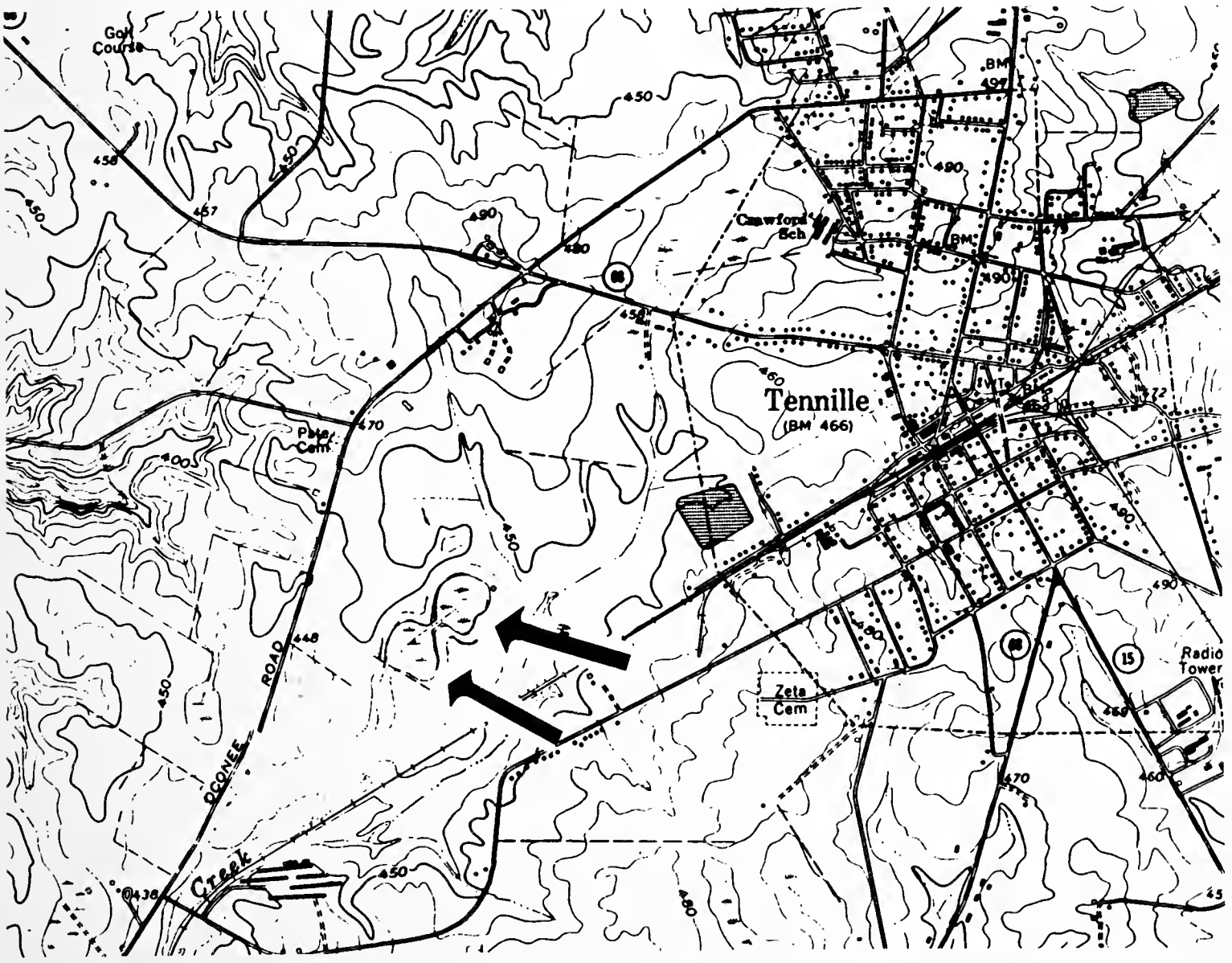


Fig. 3. Two depressions of possible sink-hole origin on the Sandersville, Georgia 1:24,000 quadrangle. The northernmost is a "natural open marsh" (no tree cover). True sinkholes also show on this quadrangle but not this figure.

Edgar T. Wherry (1885-1982)

Rocks and soils gave him clues

By David L. Emory

Another botanist whose unusual background and interests led him in the direction of Dr. Wharton's technique was Professor Edgar T. Wherry (1885-1982).* A Philadelphian, Wherry received a B.S. in chemistry and a PhD. in geology and mineralogy from the University of Pennsylvania. After teaching mineralogy at Lehigh University, he went to Washington, D.C. as Assistant Curator of Mineralogy in the U.S. National Museum and later as crystallographer in the Department of Agriculture.

Wherry developed a technique for measuring the acid-base level of soils with indicator dyes (similar to litmus), the basis for soil test kits used in agriculture and horticulture today. He became so well known for his studies of the soil preferences of plants that some were known to call him Edgar "pH" Wherry.

In 1930, Wherry returned to the University of Pennsylvania as Associate Professor of Botany-Ecology. Upon retiring in 1955, he continued his field work establishing range extensions for many plants by hunting them on their favorite rocks and soils. He became interested also in the taxonomy of ferns and Phlox. Thus his career spanned many fields—from molecules, crystals, and ions to genera, species, and hybrids.

Wherry travelled extensively through 48 states collecting specimens for the herbaria of the University of Pennsylvania and the Philadelphia Academy of Natural Sciences. With his friend Harry W. Trudell, on June 7, 1927, he discovered a fine colony of Georgia plume (*Elliottia racemosa* Muhl.) in full bloom south of Metter in Candler County, Georgia—the first discovery in 24 years of a new population of this rare plant. This station was rediscovered in 1961 by Craig Bell and David Lawson of Savannah.

Under the title "Fern Field Notes, 1935" in Volume 25 of the *American Fern Journal,* Wherry published a brief account of his extension of the range of the blackstem spleenwort (*Asplenium resiliens*) into southern Pennsylvania. "In the main limestone valley around Greencastle there seemed to be no cliffs of sufficient size to furnish a favorable habitat for it, but in a narrower strip of limestone east of Mercersburg...a small colony of the species sought was finally found on one sheltered cliff."

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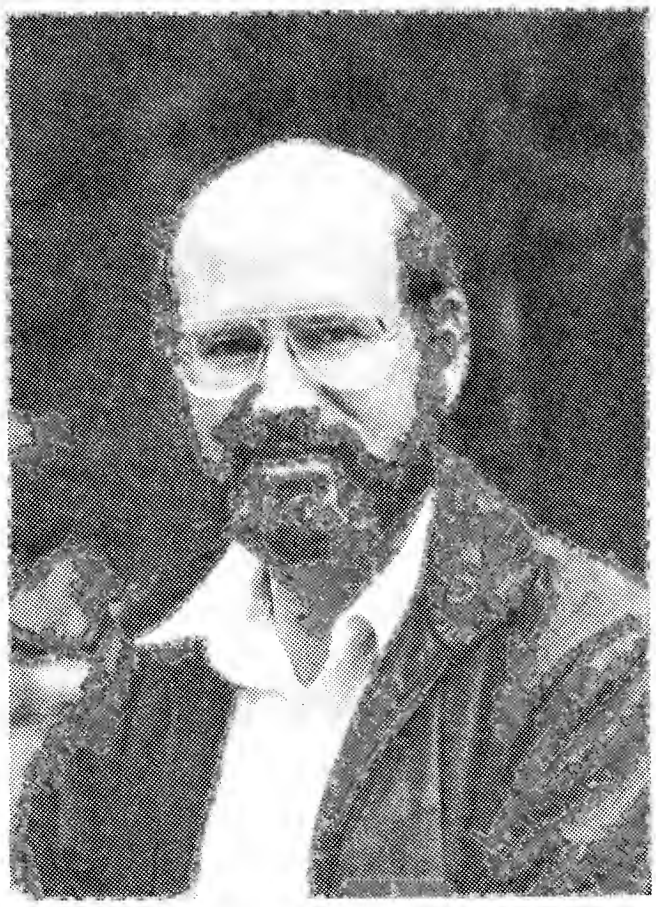
*Much of the information in this account was furnished by Milton Laden of the American Rock Garden Society, Delaware Valley Chapter, 334 Wellesley Road, Philadelphia, PA 19119. He is collecting materials for the Wherry Collection at the Philadelphia Academy, and requests anyone who has correspondence with Dr. Wherry, or other information, to please contact him.

Stephen M. Bowling: A Georgia Botanist



Field trips lend meaning to ecological study

STEPHEN M. BOWLING, known to the Georgia Botanical Society as Steve, is a field botanist *par excellence.* It is *fun* to botanize with Steve or to take one of his courses. Steve has a rare gift for teaching botany, patiently answering all questions and expressing himself in colorful, memorable imagery. Marie Mellinger, past President of BOT-SOC, refers to these expressions as "Bowlingisms." Steve, for example, refers to a group of plants as "Goldilocks plants": Like Goldilocks ("This porridge is too hot, this porridge is too cold, this porridge is just right"), they have narrow requirements: not too wet, not too dry, not too sunny, not too shady. Bowling's First Law of Phytogeography is: "In order for a plant to occur in a given locality, it has to have gotten there in the first place." He loves to say of especially difficult genera, "You panic at the thought of learning panic grasses," or "*Botrychiums* are exceedingly trickium." He calls *Passiflora pallida,* "the dispassionate passion flower."

Steve has four private categories of plant taxonomy.

The first is the Professor Henry Higgins category: "By George, I think she's got it." These are the plants that one knows for certain.

The second is the Hamlet category: "To be or not to be," where one is uncertain and heads home to study reference works.

The third is the Scarlett O'Hara category: "I'll worry about that tomorrow." These are plants you'd like to know more about—some day.

The final category is Rhett Butler: "Frankly, my dear, I don't give a damn." Promising botanists move up this taxonomic ladder, but even Steve admits to a few Rhett Butlers.

By Georgine Pindar

Steve's main employment these days is with the WAPORA Company (an acronym for Water Pollution Research and Associates), working not directly with pollution but with species' surveying, vegetation mapping, and wetlands. Doing such surveys and identifying plants have been a large part of Steve's work since 1975. He has worked for the U.S. Forest Service; the U.S. Fish and Wildlife Service; the National Park Service; the U.S. Corps of Engineers; and the Georgia Department of Natural Resources in protected plant and natural areas progams, and he has worked with many private firms in developing environmental impact statements and encouraging sound ecological decisions. He was on the Task Force that drew up the initial state list of threatened and endangered plant species in 1975 and on the Task Force which revised the list in 1977. Steve has been associated with Dr. Charles Wharton, formerly of Georgia State

University, on field work for *The Natural Environments of Georgia*. (see p. 26). Charles Wharton says that Steve was of enormous help to him in finishing the book. He and Steve had a wonderful time together in south Georgia, and Professor Wharton is deeply grateful for Steve's contributions, particularly in the latter phases.

Steve himself has written little for publication, but he feels the need to begin documenting in a permanent form what he has learned and discovered through the years.

His list of Georgia finds is impressive and includes the Ohio buckeye, *Aesculus glabra;* running clubmoss, *Lycopodium clavatum;* American smoketree, *Cotinus obovatus;* bent-stalk trillium, *Trillium flexipes;* Alabama snow-wreath, *Neviusia alabamensis;* downy mock-orange, *Philadelphus pubescens;* Cuthbert's turtlehead, *Chelone cuthbertii;* and choke cherry, *Prunus virginiana*. In addition, he rediscovered the Ocmulgee skullcap, *Scutellaria ocmulgee,* which had been presumed extinct. He also added Yellowwood, *Cladrastis kentukea,* to the South Carolina botanical list. Of course, Steve adds the modest disclaimer that he may simply not be *aware* that others have discovered any of these first.

Steve has made contributions, too, to nature and environmental groups. From 1976 to 1978 he was a fine, though reluctant, President of the Georgia Botanical Society. He has served on both the Forest and Woodlands Committee and the Natural Areas Committee of the Georgia Conservancy, and, in addition, he has testified in support of the Georgia Wilderness Act of 1984 before a U.S. Senate Subcommittee. He took part in the Georgia RARE II Environmental Council and was on the Executive Committee of the Roadless Area and Review Council (RARE II). From 1979 to 1985 he was both the Treasurer and Cartographer and Route Determiner for the Benton MacKaye Trail Association.

Does Steve have a favorite plant? Yes, it is the Grass-of-Parnassus (*Parnassia asarifolia*), which he early found growing behind the family property in Sandy Springs. He likes the combination of its being a simple flower on the face of it but intricate on closer examination. On the simplest level it is a five-petalled white flower, round in form. However, the translucent veining of the petals and the staminodia that is, the crown of sterile stamens in the center of the flower that do not carry pollen, are anything but simple. The Grass-of-Parnassus is aesthetically pleasing to Steve, and it is uncommon enough that a sighting holds a special excitement.

The writer is proud that Steve credits her with getting him interested in the out-of-doors. When he was in the fifth grade at S. M. Inman School in Atlanta, I began to take children on birding trips on Saturday mornings, sometimes with the Atlanta Bird Club (now the Atlanta Audubon Society). We also looked at bird films from the public library and attended the five Audubon Screen Tours each year, and at least twice Steve joined us on longer trips to Wakulla Springs, Florida, and to the Okefenokee. Always the emphasis was on birds, but Steve managed to include some study of the trees and flowers. (Can you believe there was a time when Steve could mistake a common lawn weed for trailing arbutus, *Epigaea repens*?) When I recognized his interest in botany, I began to take Steve along on some of the Georgia Botanical Society Sunday afternoon walks with Dr. Eugene Heath, Founder and First President, and Steve joined the society at about the age of twelve. Dr. Heath insisted on his using scientific names, and he guided Steve from a passing interest in plants to a serious interest.

After a short hiatus while in high school, Steve returned to the Botanical Society. He remembers a trip in the fall of 1970 to Yonah Bald during Marie Mellinger's presidency when his interest rekindled. It has never diminished since.

He found on ensuing field trips many knowledgeable people who were willing to answer his questions. Then he would go home and sometimes stay up half the night trying to dig out even more technical information from the limited botanical library he owned at the time.

Marie appreciated his growing skill and asked Steve, together with Ange Hinrichs, to do a botanical study of the Cohuttas as part of a biological inventory of the Chattahoochee National Forest. The two of them worked hard at the inventory, but Steve smiles a little now at the simplicity of the list they produced together with so much serious effort.

Steve was next asked to prepare a program on ferns for a 1971 BOT-SOC meeting. It was a daunting assignment. With ferns he found that he was not dealing with the obvious but with observing fine detail. Being forced to learn a difficult subject and share it with others was major training, useful to him later in all botanical areas of study.

We have already elaborated on Steve's skill as a teacher of field botany. He has taught at many levels, from the children at the Outdoor Activity Center in Atlanta and the Chattahoochee Nature Center in Roswell, where he was on the staff from 1979 to 1981, to knowledgeable amateurs in advanced botany classes and fellow members of BOT-SOC on numberless field trips. He conducted an in-service course in plant taxonomy for teacher certificate renewal in Fulton, Cobb, and DeKalb Counties in 1981. Along the way, he has also probably educated a few government VIP's in the flora of their state.

Steve is highly respected by leading botanists in the Southeast. Many consider him the best field botanist in Georgia. They call his memory astounding, and they are impressed with the remarkable breadth and scope of his interest in plants, which goes beyond identification to plant physiology and the ecological relationships of plants.

Steve is the co-developer of the technique called "ecoteering" (ecological pioneering, using available maps and visual aids in locating plant communities). Charles Wharton tells us more about this in the current issue of Tipularia. (See p. 10.) He says, "Our favorite amusement is to develop and demolish hundreds of theories as to how plants relate to geology, soil, slope, and moisture."

Steve has done more botanizing in north Georgia than anywhere else, but he is gradually working more in south Georgia. He is also especially interested in the northwestern part of our state, with its ridge and valley topography, and in the Cumberland Plateau, which he says has not yet been thoroughly studied. Steve has done extensive work on wetlands in Delaware, Virginia, and Michigan as well as some work in Kentucky and elsewhere. He has made several trips out West since 1982, and enjoys photographing the many species new to him there. Steve would like eventually to do some tropical botanizing, and he would like to compare for himself the botany of Southeast Asia with the botany of our Southeastern states. Australia also attracts him, but all that is far in the future.

Steve has a life-time dedication to botany and to its place in our total environment. Less well-known is another abiding interest of his: music, particularly vocal music. He has sung not only in choirs, but he has also performed as a tenor soloist. At present he rehearses once a week in Chamblee with a madrigal group called the Meistersingers, directed by Fyodor Cherniavsky.

Does Steve have any advice for the next generation of botanists? Yes: Remembering the wonderful people in his life who have given him a hand up, he advises aspiring botanists also to find someone who is knowledgeable and willing to answer questions. Moreover, he advises students to go into the field at every opportunity; field trips give meaning and understanding to academic study.

Chicopee Woods Nature Preserve

By Andrea O. Timpone

The Chicopee Woods Nature Preserve in Gainesville, Georgia, is one of Georgia's newest protected natural areas. Over 2,700 acres of forested land intersected by I-985 lies between the Oakwood (Exit 4) and Candler Road (Exit 5) exits. This land was donated in 1984 by Chicopee Mills to be used for recreational and educational purposes.

The Chicopee Woods Park Commission was created to plan and seek development for this unique resource. Under the Park Commission's guidance and authority, 1,500 acres on the eastern side of the expressway was set aside as nature preserve. This land, for the most part, will be preserved in a natural condition. Elachee Nature Science Center has leased 150 acres to use for educational programming. In a recent sales tax referendum, $1.2 million was allocated for the construction of a nature center.

Over 2,000 students and hundreds of adults enjoy environmental education programs in Chicopee Woods each year. Most of the programming is done along the mile-long Ed Dodd Nature Trail. Built by volunteers, this trail winds through an unusual area which can delight the botanist with an amazing variety of trees, shrubs and the season's wildflowers.

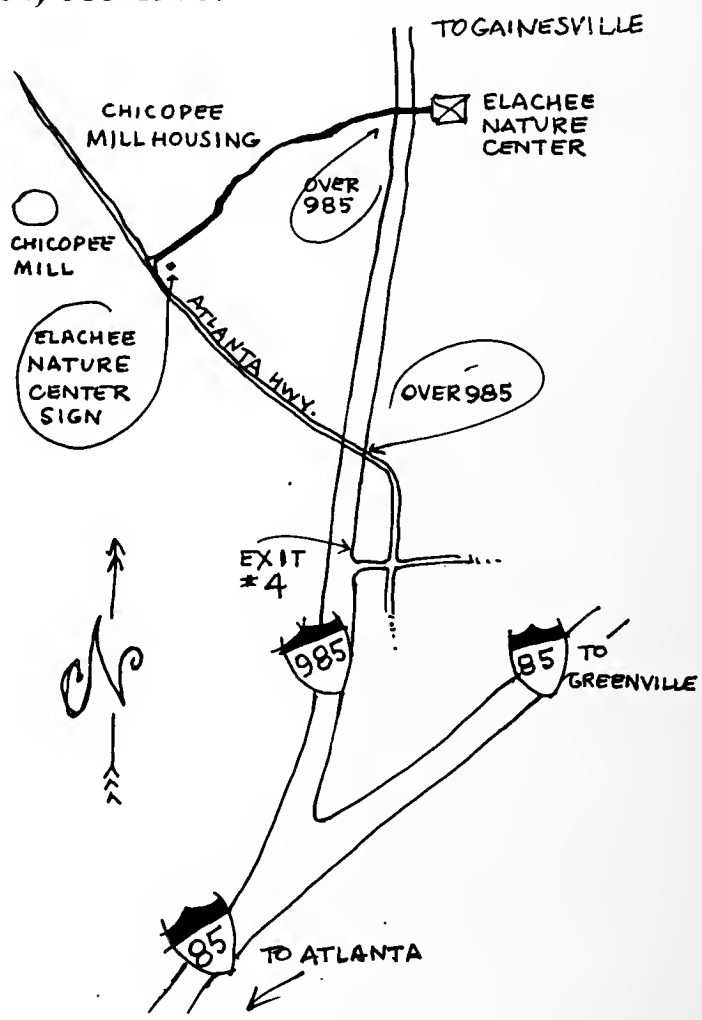
Chicopee Woods Nature Preserve lies in that part of Georgia in which the Appalachian foothills meet the piedmont. Not surprisingly then, you'll find typical north Georgia botanical species—such as the mountain laurel *(Kalmia latifolia* L.*)*; rhododendron; yellow-root *(Xanthorhiza simplicissima* Marsh*)*; foamflower *(Tiarella cordifolia* L.*)*; galax *(Galax aphylla* L.*)*; irises, and black cohosh *(Cimicifuga racemosa* Nutt.*)*; along with species found further south—such as bloodroot *(Sanguinaria canadensis* L.*)*; Queen Anne's lace *(Daucus carota* L.*)*; jewelweed *(Impatiens capensis* Meerb.*)*; hearts-a-bustin' *(Euonymus americanus* L.*)*; fetterbush *(Pieris floribunda* (Pursh) B.&H.*)*; and yellow buckeyes *(Aesculus octandra* Marsh*)*.

A spring walk along the nature trail takes you through large masses of blooming trillium *(T. sessile, T. cernuum,* and *T. catesbaei)*; hillsides of foamflower; sweet-shrub *(Calycanthus floridus)*; and Jack-in-the-pulpit *(Arisaema triphyllum (L) Schott)*. These are found along the moist, rich floodplain of Walnut Creek. The nodding trillium was an addition to the Georgia Botanical Society's range records.

The dry ridges in Chicopee Woods contain vast stretches of *Vaccinium;* storax *(Styrax)*; huckleberry *(Gaylussacia frondosa* (L.) T.&G.*)*; and a wonderful variety of oaks—chestnut *(Quercus prinus* L.*)*; yellow chestnut *(Q. muehlenbergii* Engelm); white (*Q. alba* L.); red (*Q. rubra* L.); scarlet (*Q. coccinea* Muench.); black jack (*Q. marilandica* Muench.); water (*Q. nigra* L.); and willow (*Q. phellos* L.).

Other botanical sightings in Chicopee Woods include seven species of sedges, an awesome 60-year-old stand of yellow poplars, with an understory thick with pawpaws, (both *Asimina triloba* and *A. parviflora*), and jewelweed, and a wide variety of ferns—rattlesnake, lady, Christmas, broad beech, New York, netted chain and ebony spleenwort. A total of 178 botanical species were listed on a spring Bot Soc trip in 1986.

Chicopee Woods Nature Preserve is open to the public and may be accessed by a gravelled road (look for the Elachee Nature Science Center sign) located 1.4 miles west of I-985 on the north side of Georgia Highway 13. For more information, call Elachee at (404) 535-1976.



My Task Is a Trust

UGA's Herbarium Curator loves her work

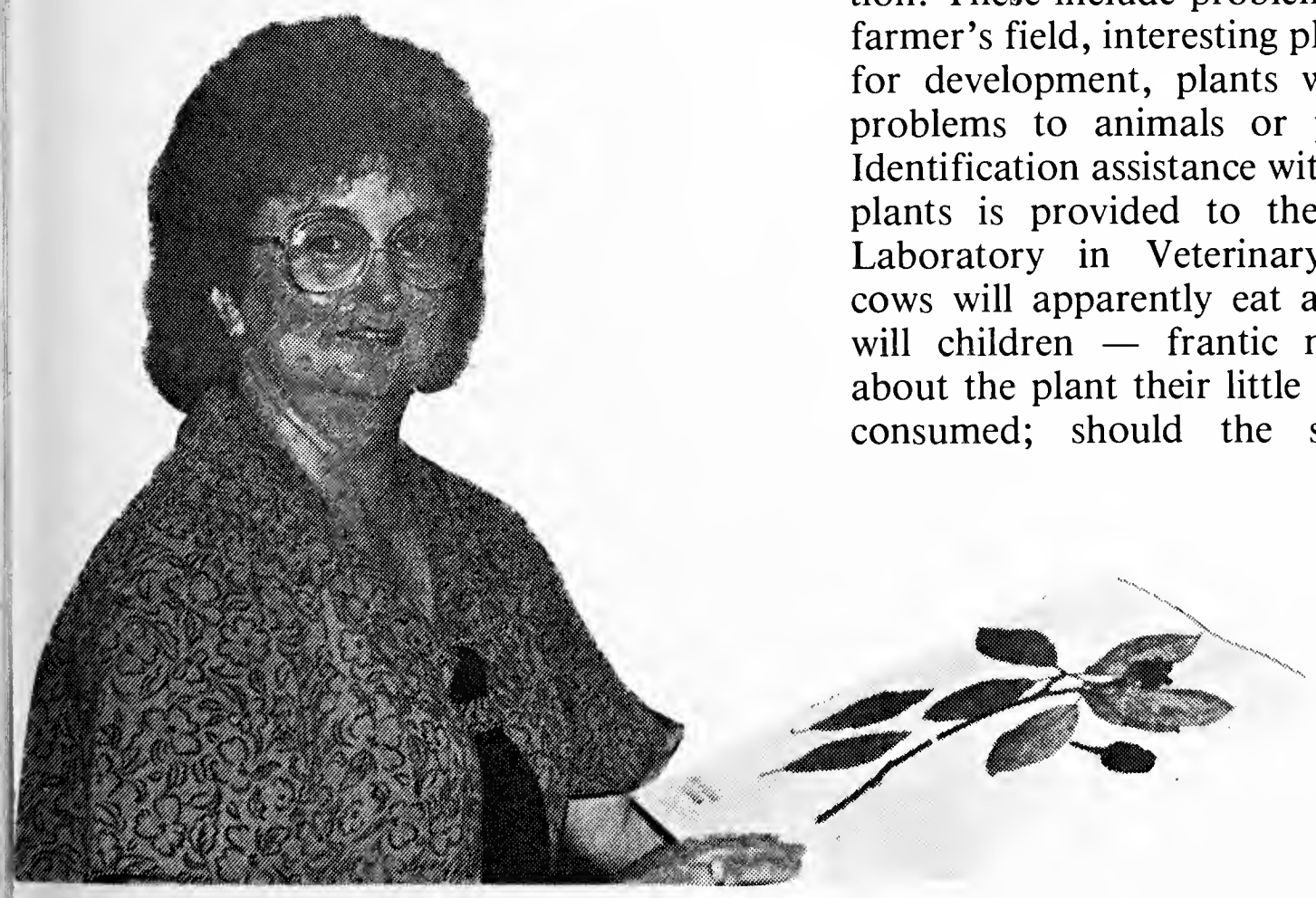
By Nancy C. Coile

Questions I am often asked: What's it like to be the Curator of an herbarium? And, how did you get there anyway? This article will hopefully answer those questions and some others.

As the title "curator" implies (from the Latin *"curare"* meaning to care), the curator takes care of the herbarium. Just as an art curator has care of art objects, so an herbarium curator has care of herbarium specimens. The Herbarium is a priceless collection—part of the heritage of Georgia. Dr. Samuel B. Jones and I regard this as an immense responsibility.

The University of Georgia Herbarium has several functions and fits into the University of Georgia's goals for teaching, research and service. An herbarium is a collection of pressed, dried and mounted plants. Each herbarium has an acronym for ease in communication; ours is GA, Gray Herbarium at Harvard is GH, Kyoto University is KYO, Missouri Botanical Garden is MO, North Carolina is NCU, Royal Botanic Gardens of England is K, Valdosta is VSC, etc. GA houses 180,000 specimens from all over the world, although we specialize in the southeastern flora. GA is a valuable resource to the citizens of Georgia as a record of the plants which grow in the state.

One responsibility is the identification of plants sent to the herbarium for various reasons. The Cooperative Extension Service often sends to us plants which have come to them for identification. These include problem weeds in a farmer's field, interesting plants wanted for development, plants which create problems to animals or people, etc. Identification assistance with poisonous plants is provided to the Diagnostic Laboratory in Veterinary Medicine; cows will apparently eat anything! So will children — frantic mothers call about the plant their little one has just consumed; should the stomach be



pumped? Also appearing on my desk are inquiries from the curious about an unusual plant they have found. This is my favorite type of identification, for it involves interest rather than need.

Record keeping is another necessity, and I handle the loan and exchange transactions. Since Georgia is in an interesting area, our specimens are loaned to researchers around the world for their taxonomic investigations. We are very glad to lend the specimens since the researchers will identify and annotate the specimens, and this annotation by an expert makes the specimen even more valuable. Also, student and faculty researchers at GA borrow specimens for their studies. The careful packaging of specimens going to and from our herbarium is a very critical step.

Another transaction which involves record keeping is exchanges. When duplicate specimens are gathered, only one is kept in GA or other local herbarium and the others are distributed to herbaria around the world. We have exchange agreements with 82 herbaria world-wide. For example, we are excited when we receive an exchange from Kyoto University in Japan because those specimens will probably be new species and maybe new genera for us. Hopefully, other herbaria are excited to get specimens from Georgia and of taxa which researchers at Georgia are studying.

The herbarium provides documentation for studies in floristics and any research involving plants. Documentation is very important. Critical studies have been invalidated because researchers could not be sure of the identity of the species under study when results were challenged. For example, Dr. Jones tells the story of a thistle he found in Mississippi and keyed out in the Carolina flora manual. A chromosome count was made for the thistle, reported in the literature, and he placed a voucher specimen in the herbarium. Some years later, a researcher who was studying thistles was puzzled by the report about that thistle. He asked for the loan of the voucher specimen and discovered that the thistle was incorrectly identified. Although the specimen keyed-out in the Carolina flora, that species did not occur in Mississippi. The research was not invalidated; the specimen under study was not a guess-what, but a concrete example which could be examined and corrected.

Since teaching is an important part of the University, the Herbarium is always glad to assist in any way needed to enhance teaching at Georgia. Herbarium samples are borrowed by classes in botany, ecology, landscape architecture, pharmacy, veterinary medicine, biology, etc. to illustrate concepts. Herbarium personnel provide lectures to various groups around the state and thereby fulfil both service and teaching functions.

In the past eight years, we have concentrated on increasing our collections in several neglected areas, such as northwestern Georgia, especially Pigeon Mountain; the Cohuttas; aquatic areas; and St. Catherines Island. Individuals throughout the state are encouraged to deposit specimens from areas in which they are interested. You will be in good company! Some of the persons who have contributed valuable specimens are: Lloyd H. Snyder (ferns), James R. Allison (granite outcrop specimens), George A. Dorsey (Floyd Co. & Cobb Co.), Robert A. Norris, Angus K. Gholson (SW Georgia), Harriett G. DiGioia (Murray Co.), Thomas S. Patrick, Susan Richmond (Laurens Co.), David Emory and Robert B. McCartney (rare plants). We encourage all *Tipularia* readers to contribute additional specimens. We will gladly type the labels if that is a problem which discourages you from contributing!

Each year we try to add at least 5,000 specimens to the herbarium collection. This past year, we fell short of our goal of 5,000 additions, but we are still pleased with our progress. An electrically-operated, space-saving compactor system was installed which doubled the number of our herbarium cases for the

collection. A wonderful addition, but one that necessitated shifting the formerly cramped collections! All this activity left little time for mounting or filing. We are now working at getting back to normal.

When I first started to work at the University of Georgia Herbarium in 1973, my job was herbarium technician; Dr. Wilbur H. Duncan was the Curator. The majority of my responsibilities then were mounting pressed plants, filing them and following Dr. Duncan's directives. After having performed the duties as a teacher for two years in the Clarke County School system, I felt that I was being underutilized in that job at the Herbarium.

'I cherish my involvement with the graduate and undergraduate students'

Since the income was needed by my family, I stayed on at the Herbarium but enrolled in Graduate School in the Entomology Department to work toward an M.S. degree. (Entomology was my undergraduate degree and even yet is a fascinating area to me.)

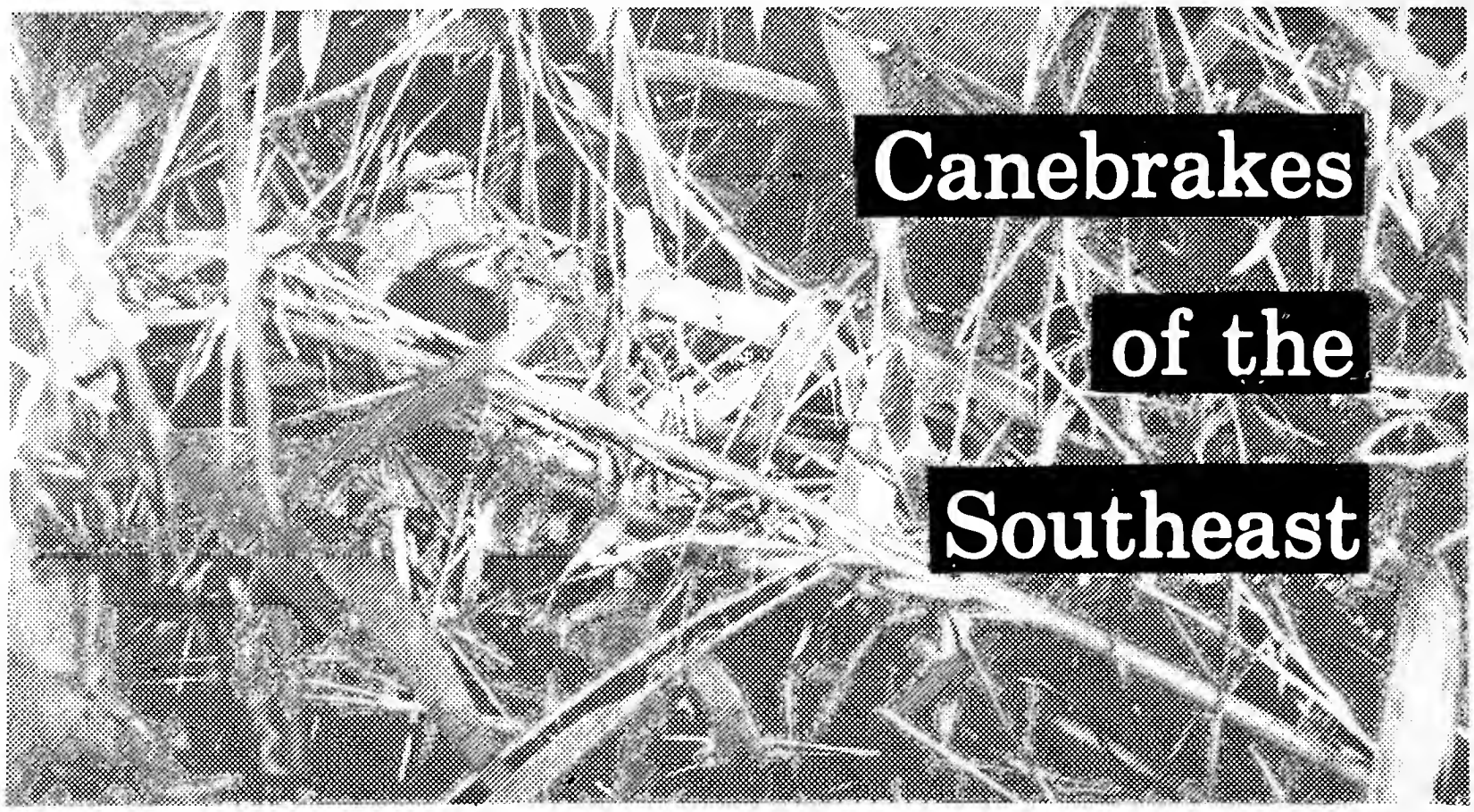
After having completed several entomology courses, I took the spring plant taxonomy course from Dr. Jones and promptly fell in love with plant taxonomy. I chose to survey the flora of Elbert County, Georgia for my thesis project in Botany. Elbert County was chosen for several reasons. It is the neighboring county of my father's home. It is only an hour's drive from Athens, so it was not excessively inconvenient for conducting field work. Also, several persons had indicated that the flora of Elbert County might be interesting. Indeed, it was! It was an excellent beginning spot for learning the flora of the southeastern United States. Both my young daughter and son helped with the collecting on the weekends. In 1979, my daughter Danielle, son Robbie and husband Robert watched while the M.S. in botany was given to me. It was a proud moment for all of us.

Now I am in the midst of doctoral research, having an "ABD" degree — "all but dissertation" or "all but degree," as the jokes go. The National Science Foundation funded my doctoral dissertation research proposal on the systematics of the deciduous, non-spiny members of the genus *Ceanothus (Rhamnaceae).* I collected specimens of *Ceanothus* of the West Coast, the Mid-West, and Southeast. Using the material collected on these field trips, I conducted flavonoid chemistry studies. Scanning electron microscopy of the seeds and leaf surfaces was completed. Morphological measurements have been made for the phenetic and cladistic analyses. I have enjoyed the privilege of examining these species and will be pleased to share some of the more interesting aspects of *Ceanothus* with this readership at a later date.

Dr. Jones was appointed Curator in July 1978 and I served as Assistant Curator. My responsibilities were increased and, with them, my job satisfaction. In 1981, Dr. Jones was named Director of the Herbarium and I was named Curator.

The best aspect of my job is the people with whom I have contact, both locally, state-wide and nationally. Many of the people I have met were folks I had admired from afar previously. Mostly, these plant-loving people are vibrant, perceptive, and full of good humor. Especially, I cherish my involvement with the graduate and undergraduate students; the future looks good to me!

If you are in Athens, please stop by for a visit, and we will let you operate the compactor system to find your favorite group of plants. We are part of your heritage and a valuable resource in the state!



Canebrakes of the Southeast

Are they disappearing?

By Brooke Meanley

Canebrakes are unique, as no other woodland plant community in North America remotely resembles them. Since giant cane *(Arundinaria gigantea)* in the Deep South occurs mostly in floodplain or bottomland forests, some stands are partly inundated for short periods, usually in the spring. Canebrakes occurring on second bottoms or ridge bottoms may be flooded only once in a decade. Because such stands grow in rich alluvial soils, they have been displaced over much of their former range by agricultural crops.

A smaller form of cane, switch cane *(A. tecta)* of some authors or treated as a variety of *A. gigantea* by others, is associated with various soil types, including the peat soils of Carolina Bays or Pocosins as far north as the Great Dismal Swamp in southeastern Virginia. In the central part of the United States, cane in some form reaches its northern limit in southern Illinois and southern Missouri, and its western limit in eastern Oklahoma.

The best descriptions of the vast canebrakes of the past are from early naturalists and hunters. President Theodore Roosevelt, a naturalist with a life-long interest in birds and mammals, described the canebrakes as he saw them during a hunting trip in northeastern Louisiana in 1907, "The canebrakes stretched along the slight rises of ground, often extending for miles, forming one of the most striking and interesting features in the country. They choke out other growths, the feathery graceful canes standing in ranks, tall, slender, serried, each but a few inches from his brother, and springing to a height of fifteen or twenty feet. They look like bamboo; they are well nigh impenetrable to a man or horse; even on foot they make difficult walking, unless free use is made of the heavy brushknife." (From "In the Louisiana Canebrakes" by T. Roosevelt, *Scribner's Magazine*, 1908).

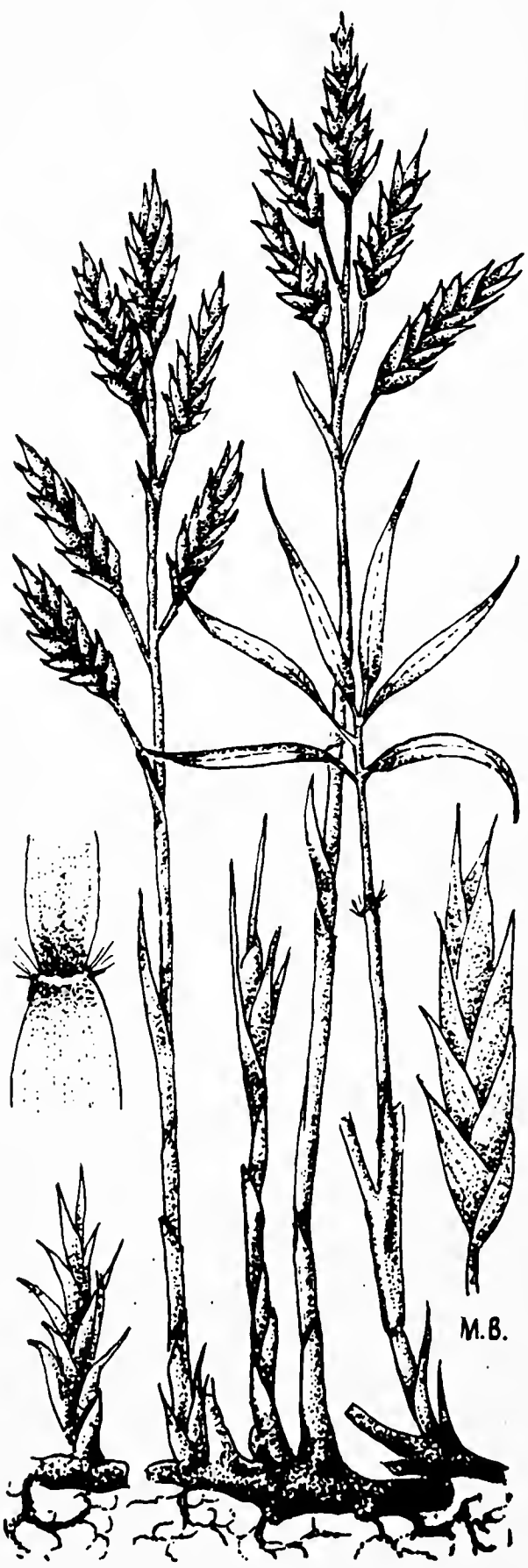
Farther down the Mississippi River, near present Baton Rouge, Louisiana, William Bartram writing in 1787: "...entered the cane forests, following a straight avenue cut through them,...which continued about eight miles...." And in 1778, in southern Alabama, along the Tombigbee River,

he spoke of canes "thirty or forty feet high, and as thick as a man's arm or three or four inches in diameter." (From *Travels*, etc. by W. Bartram, 1791. Philadelphia).

Like Roosevelt and other hunters in the early days who sought out the canebrakes because of the diversity of wildlife, in the 1950's I was curious to note the birds, mammals, and other plant life in a canebrake along the lower Arkansas River near Pendleton Ferry, Arkansas. The forest overstory was composed mainly of sweet pecan *(Carya illinoensis)*, sweet gum *(Liquidambar styraciflua)*, and sugarberry *(Celtis laevigata)*. Two of the most abundant mammals were the armadillo *(Dasypus novemcinctus)* and the swamp rabbit *(Sylvilagus aquaticus)*. At the edge of the canebrake I found a dead wild turkey *(Meleagris gallopavo)* that had recently been killed by a bobcat *(Lynx rufus)*. The bobcat scat nearby contained fragments of turkey bones (later identified at the Smithsonian Institution). The crop of the wild turkey was full of buttercup *(Ranunculus* sp.*)* flowers!

The Arkansas canebrake covered about 50 acres. The most extensive canebrake that I have seen covered an area of about one square mile, and was located in the Ocmulgee River floodplain forest just south of Macon, Georgia, in the 1940's. The cane poles in this brake averaged about 15 feet in height and three-fourths of an inch in diameter at ground level. A few canes were 20 feet high and 1.5 inches at the base. (Switch cane poles in the Great Dismal Swamp, Virginia, reach a height of only seven or eight feet.)

It was in the Ocmulgee River canebrakes that I began a formal study of Swainson's warbler *(Limnothlypis swainsonii)*, when I was stationed at Camp Wheeler during World War II. Of 91 territorial male Swainson's that I observed over several years in the Ocmulgee River canebrakes, 87 had breeding territories (averaging about one acre) in patches of cane growing beneath the floodplain forest canopy. The floodplain forest in this area was composed mainly of sugarberry, box-elder *(Acer negundo)*, ash *(Fraxinus* sp.*)*, American elm *(Ulmus americana)*, sweet gum, water oak *(Quercus nigra)*, silver maple *(Acer saccharinum)*,



Illustrated by Margery Borom

mulberry (*Morus* sp.), and tupelo gum *(Nyssa aquatica)* on the wetter sites.

One day I followed an old logging road down through the Ocmulgee bottomland forest to within a fourth of a mile of the river to photograph a Swainson's warbler on a nest in a cane stalk. There had been a storm several miles north of Macon, and while I was photographing the incubating Swainson's warbler, the river had crested and was slowly inundating the bordering floodplain. By the time I completed taking pictures I was standing in two feet of water, and water had risen to within one foot of the nest.

As I began walking out of the bottomland forest along the old logging roadbed, the water continued to rise and eventually was up to my waist. Shortly, a man came along on a mule, and lifted me and my camera equipment onto the back of the mule, and we lumbered out of the flooded bottom.

The nest that I had been photographing was positioned on a tilted cane that continued to rise with the water, and thus was not destroyed.

Some 20 years later I drove down from Laurel, Maryland, to Macon to continue my studies of Swainson's warbler, and upon arriving there found the whole bottomland flooded to the edge of the upland. The long trip was in vain. In subsequent years I checked with an ornithologist friend at Macon who consulted the river charts during the spring and advised me accordingly.

In the 1940's I went into the bottoms on a road, now blocked off, that led to the Lamar Indian Mounds. The canebrakes at that time extended down along the river for a couple of miles from the mounds. On the last visit I had to enter the bottomlands on Bond Swamp Road, which leads off the highway to Cochrane and Eastman, Georgia. On that last visit to the Ocmulgee River canebrakes in 1970, they were still much as they had been in the 1940's, and the Swainson warblers were still nesting there.

Research Report

Boulder Fields, Old Fields and Hardwoods

Edited by Harriett L. Whipple

Rebecca Sharitz, Savannah River Ecology Laboratory, University of Georgia, is continuing research on the ecology of *Taxodium distichum* and *Nyssa aquatica* in the flood plains of the Savannah River and its tributaries.

Ken McLeod, Savannah River Ecology Laboratory, University of Georgia, is studying the physiological responses of bottomland hardwoods to stress. Some species of major interest are *Taxodium distichum, Nyssa aquatica, Cephalotaxus occidentalis, Salix nigra,* and *Acer rubrum.*

John Pinder, Savannah River Ecology Laboratory, University of Georgia, is continuing his long-term project of studying the community structure and succession processes in old fields.

John Knox, Savannah River Ecology Laboratory, University of Georgia, has made an inventory of the threatened and rare plants of the Savannah River Plant. The DOE has been requested to consider the inventoried population in the management of SRC lands.

Madeline P. Burbanck, Emory University, presented a paper on the vegetation of granite outcrops in the southeastern United States at the 50th anniversary meeting of the Association of Southeastern Biologists.

Derek Focho, University of Georgia, has received a grant from USAIO for breeding experiments with *Pennisetum,* a genus of grasses.

Linda Chafin, University of Georgia, has completed her thesis on a comparison of two boulder fields and a basic cove on Tray and Coosa Mountains. She will be doing an internship with the Georgia Heritage Program.

David E. Giannasi, University of Georgia, has been learning techniques using DNA for taxonomic research at the University of California at Riverside.

Addenda

Dusky Windows

I was interested in reading of my friend Warren Stoutamire's moth pollination research in one of the Tipularia articles ("The Crane-fly and the Moth," November 1986). Warren did that research on hot summer evenings in my woods in North Carolina.... The pollination visits were made during a very narrow dusk "window," and if we were too early or too late, we either waited or came back the next evening respectively! — *Donald E. Schnell, M.D.*

Family Memories

The Tipularia article on Miss Eliza Frances Andrews was of great interest to me, since she was a LaGrange College classmate and friend of my great-grandmother, Frances Amanda Ward Johnson (1841-1924).

My mother remembers the other family members taking Grandma Johnson to Alumnae Day at LaGrange College (probably in 1922, the 65th anniversary of her graduation), where she and Miss Andrews were guests of honor, being the only surviving members of the Class of 1857.

My great-grandmother's diploma from LaGrange College is dated July 15, 1857, and is printed in French.... My great-grandmother and Miss Andrews attended the Methodist female college, which is still located today on the same site. In 1857 this college consisted of one building...this building is now called Smith Hall and is still standing today. — *A. Stephen Johnson*

Granite Crops up Again

"Taking It for Granite" (November 1987 issue of Tipularia) by David Emory was cropped for reasons of space. The Editors regretted having to do so, and are delighted that the Addenda Department allows a salient point the article covered to be brought to our readers in the following paragraphs. David wrote:

"Madeline P. Burbanck and Robert B. Platt were cited as studying the " 'island communities,' which develop in soil filled depressions" in granite outcrops "that rarely contain standing water."

Burbank and Platt defined four successional communities:

1. Diamorpha community. Soil less than 4 inches deep. Contains an abundance of diamorpha in season and a few lichens and mosses.

2. Lichen-annual community. Soil 3-6 inches deep. Contains lichens, mosses, sandwort, rushfoil, pineweed, Confederate daisy seedlings, and other annuals.

3. Annual-perennial herb community. Soil 6-16 inches deep. Contains mature Confederate daisies, sunnybells, and woolly groundsel, especially, and Georgia rush, granite-loving sedge, rock portulaca, Curtiss's milkwort, star bluet, rock-dwelling tickseed, and perennials not restricted to granite outcrops.

4. Herb-shrub community. Soil 16-20 inches. Contains a variety of small trees, vines and herbs. Could lead to vegetation characteristic of climax forest if area increased and soil became deeper still. Under present conditions, however, the herb-shrub or shrub-tree communities on granite outcrops in Georgia appear to be edaphic climax communities. Burbanck and D. L. Phillips reported in 1983 that it has been observed they regress to an earlier successional stage when stressed by drought conditions and competition between plant species.

Granite outcrops face several threats: continued quarrying; damage from motorcycles, cars, and off-road vehicles; use as junk dumps; and damage by inhabitants of adjacent pastures—what a writer for a 1987 Endangered Species Technical Bulletin described in a wonderful choice of words as "trampling and nutrient overload." — *Ed.*

Book Report

Environments of Georgia Classified and Described

By Jonathan Ambrose

The Natural Environments of Georgia, 1978, by Charles H. Wharton. Georgia Department of Natural Resources, Georgia Geological Survey, Atlanta, GA. 227 pp. Paperbound. $4.00.

This book represents a most ambitious endeavor: the classification and description of the natural environments of the entire state of Georgia. It is the product of a study funded by the Georgia Department of Natural Resources (DNR) and conducted by Dr. Wharton. DNR realized by the mid-1970's that production of such a document was necessary for adequate stewardship of the state's natural resources. While much information had been collected on the physical characteristics or biotic composition of natural environments in a piecemeal fashion, the challenge was to pull together this information from hundreds of sources, develop a classification system which would adequately distinguish different types of environments, and address those areas which represented obvious gaps in our knowledge of the natural history of the state.

"Natural environments" are defined in this book as self-perpetuating (climax) biotic units similar to those encountered by the first European or Asiatic visitors to Georgia.

Wharton writes, "some of the environments would qualify as distinct ecosystems, others might not. 'Ecosystem' implies a functional relationship between all parts of a particular community—our knowledge is reasonably complete for only a few ecosystems."

The book is composed of three major sections: hydric systems, mesic to xeric systems, and appendices. The section on hydric systems addresses both flowing and nonflowing aquatic environments, plus temporarily-flooded environments such as low floodplain forests. A dichotomous key is provided to facilitate differentiation of the wetland environments. Terrestrial systems are subdivided by physiographic divisions of the state, and are differentiated on the basis of vegetational life-form, leaf shape (needleleaf or broadleaf), and function (evergreen or deciduous). Dichotomous keys are provided for terrestrial environments within each of the physiographic divisions. For both aquatic and terrestrial systems, descriptions of natural environments are presented along with information on distribution within the state and characteristic flora and fauna.

The appendices include a glossary of plant names, a list of representative mollusks and crustaceans of Georgia's freshwater systems (with distribution codes), lists of birds, freshwater fish, amphibians, reptiles, and mammals (also with distribution codes), and the literature cited.

Deficiencies of the text are relatively minor. Perhaps the most noticeable is the variability in depth of coverage for different types of natural environments. This is understandable, given the lack of detailed knowledge of Georgia's ecosystems. Dr. Wharton asserts that this lack of knowledge of ecosystem function is a compelling reason for avoiding human impacts on natural systems.

In the ten years since its publication, "The Natural Environments of Georgia" has proven a valuable tool for amateur naturalists, students of biology, and those involved in the protection and management of Georgia's natural areas. The information in this book is presented in such a way that it is accessible and useful on several different levels, depending on the biological expertise and interest of the reader. At its current price of $4.00 (plus $1.00 shipping and handling), this document represents an outstanding value. — Jonathan Ambrose

Byliners

Artists

Jean Farr Pittillo, has a B.S. in botany from the University of Georgia. She is presently pursuing her interest in botanical

illustration and working toward a degree in art at Western Carolina University. She and the two children joined her husband Dan Pittillo on a trip through the Orient in 1984 under the hospitality of Yunnan University, University of Tokyo, and Hiroshima University.

Authors

Jonathan Ambrose is with the Georgia Department of Natural Resources at the Natural Heritage Inventory Station, Social Circle, Georgia.

Nancy C. Coile has completed the course work on her Ph.D. and under an NSF Doctoral Dissertation Improvement Grant is presently working on morphological and flavonoid research in *Ceanothus* (Rhamnaceae). She has been a frequent contributor to Castanea, and is co-author of both the Georgia Plant List (ed. 1 & 2) and of a floristic checklist of Clarke County, Georgia. She is a member of AIBS, American Society of Plant Taxonomists, ASB, and Sigma Xi.

John Gorecki is an Assistant Professor of English at Darton College, Albany, Georgia, and has taught English in Oklahoma, South Carolina, and Georgia for more than two decades. He reports that the wild plants of the Albany region have become a veritable passion with him. He feels that the world of higher education is overlooking the natural world. To that end he is working on some essays in an attempt to correct this neglect.

Brooke Meanley is a retired biologist from the U.S. Fish and Wildlife Service. He was stationed at Stuttgart, Arkansas; Alexandria, Louisiana; and at the Patuxent Wildlife Research Center, Laurel, Maryland. He has written ten books and various technical papers and is presently engaged in natural history studies in the Great Dismal Swamp in southeastern Virginia.

Georgine Pindar has her A.B. degree from Augustana College, Rock Island, Illinois; her M.A. from Oglethorpe University and her Ph.D. from Vanderbilt University. She is a longtime member of the Georgia Botanical Society, having served as field trip chairman in the seventies. She taught music in the Atlanta Public School system for many years, and is currently practicing law in Atlanta with her husband George A. Pindar after attending the Woodrow Wilson College of Law.

J. Dan Pittillo, Ph.D., University of Georgia, is professor of biology at Western Carolina University. His interests in botany include management of plants (two management manuals have been written for the Blue Ridge Parkway) and vegetational history of the region. He is newsletter editor for the North Carolina Bartram Trail Society and Highlands Biological Foundation. He chairs the Steering Committee of the Western North Carolina Alliance conservation organization.

Mary Sanders has been an Atlanta resident for 60 years. A retired secretary to a Vice President of the Atlanta Federal Reserve Bank, she is now a world traveler but nevertheless happy that her curiosity and interest in wildflowers continue to delight her wherever she travels.

Andrea Timpone, with a B.S. in biology and an M.Ed. with an emphasis in science education, has worked in the field of environmental education for 12 years and is currently Executive Director for the Elachee Nature Center.

Charles Wharton, Research Associate, Institute of Ecology, University of Georgia and former professor of biology at Georgia State University, has had five years' experience principally with primates in tropical and monsoon forests of the Philippines, Southeast Asia, Borneo and South America. He has published numerous volumes relevant to botany, The Natural Environments of Georgia (State of Georgia) 1978 and The Ecology of Bottomland Hardwood Swamps of the Southeast: A Community Profile (U.S. Fish & Wildlife Service) 1982, being representative of his lifework and writings.

Editorial Staff

Anna Belle Close was on the staff of Emory University Law School's Journal of Public Law in the Fifties and early Sixties. She was later a proofreader for the printing companies of Higgins-McArthur and Longino & Porter, retiring in 1980 from a typesetting position in the Printing Department of the Federal Reserve Bank of Atlanta.